

Roads and Towns In Exercises 9–16, consider the following postulates.
(See Examples 3 and 4.)

Postulate 1: Given any two towns, a road passes through them.

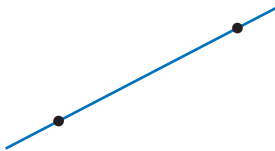
Postulate 2: Given any road, there is at least one town that the road does not pass through.

Postulate 3: There are at least two towns.

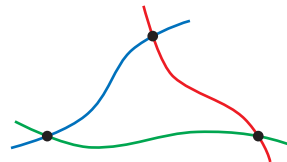


9. What are the undefined terms?
10. Does a road need to be a straight line? Explain your reasoning.
11. Write a syllogism that involves the first postulate and illustrate it.
12. Write a syllogism that involves the second postulate and illustrate it.
13. Use deductive reasoning to explain why there must be at least three towns.
14. Determine whether each model is valid. If a model is not valid, identify the postulate(s) that it violates. Explain your reasoning.

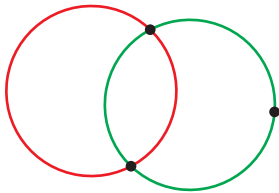
a.



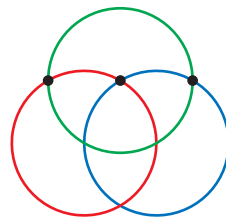
b.



c.



d.



15. Do the postulates guarantee a town at every intersection of two roads? Explain your reasoning.
16. Consider the following replacement for Postulate 2.

Postulate 2: Given any town, there is at least one road that does not pass through the town.

- a. Write a syllogism that involves the postulate and illustrate it.
- b. At least how many towns must exist? Explain your reasoning.
- c. At least how many roads must exist? Explain your reasoning.